

HI0001
Hawaiian Islands

1.0. General:

1.1. Introduction: Aerial survey HI0001 is a survey to provide high resolution controlled photographic coverage of an area that covers the Hawaiian Islands (Oahu, Maui, Molokai, Niihau, Kahoolawe, Kauai, Lanai, Hawaii and Kaula). Aerial survey HI0001 will be conducted in conjunction with two research projects. The lead person for one is Grady Tuell and the other is headed by John Klein. However, survey HI0001 has priority.

1.2. Coverage: These instructions cover the photographic flights of the designated survey area.

1.3. Scope: Ninety-four(94) flight lines at a scale of 1:24,000 are required to provide adequate photographic coverage. Control for aerotriangulation will be provided by kinematic GPS data. Only natural color photography is required along the flight lines configured. Color photography will be required to satisfy standing requirements for photobathymetric mapping. There are no tides coordinated requirements. The sun angle requirements are outlined in section 2.7. Concurrent with color photography, remotely sensed imagery will be attempted using the Hyperspectral Imaging System(HSI). An on sight representative of the contractor will be the contact person for the operations of the APT1 system. Refer to the listing of contacts under section 11.

2.0. Photographic Requirements:

2.1. All exposures will be taken along the flight lines indicated on the accompanying flight maps and way point files.

2.2. All flight lines will be flown at an altitude that produces nominal photographic scale of 1:24,000.

2.3. Expose all images so that they have a nominal end lap and side lap of 60 percent.

2.4. All flight lines are to be flown using color negative film (standard NOS emulsion film type) and the HSI system when the HSI system arrives.

2.5. All flight lines will be navigated using GPS and the Universal Management System.

- 2.5.1. Flight lines may be patched when GPS navigation is used, and kinematic data are acquired for both sides of the split flight line.
- 2.6. Begin the second portion of a patched flight line at least two photographs before where the break was made.
- 2.7. Color negative imagery and the HSI system data will be collected concurrently when the sun angle is between 10-30 degrees. The water clarity conditions will be provided daily by John Klein; he will relay this information to the mission commander the evening before overflights. Information for contacting John Klein is in section 11.
- 2.8. The HSI system may also be flown on selected test sites at a lower altitude. These way points and altitudes will be provided by this office. When flying these lines collect color negative photography in conjunction with the HSI system.

3.0. Flight Line Priority:

First priority shall be to acquire color imagery. However, as soon as the HSI arrives in HI collect photography concurrently with HSI data.

- 3.1. The Hawaiian Islands diagrams will be furnished to the flight mission. The islands have been labeled in numerical order (I thru VII) in the order of importance. There are also two islands that are labeled N/A which are the least important. For tracking and reporting purposes the islands have been assigned serial numbers 24-100's thru 24-400's.

In the 24-100's series (Kauai, Niihau, Kaula) there are twenty-four(24) lines; 24-200's series (Oahu) there are sixteen(16) lines, 24-300's (Molokai, Maui, Lanai, Kahoolawe) there are 32 lines and 24-400's series (Hawaii) there are 22 lines.

4.0. Tide Coordination:

None.

5.0. GPS Control for Aerotriangulation:

- 5.1. Kinematic GPS data are required for all imagery acquired in completion of this project.
- 5.2. GPS and EDI files are required for all color negative imagery.

- 5.3. All flight lines may be flown without a bank angle restriction. However, caution must be observed when banking so that all satellites being tracked remain locked. (See GPS SOP Section X. for further operational instructions.)
- 5.4. No support from the NGS Field Operations Branch is required for this aerial survey.
- 6.0. GPS Reference Receivers:
 - 6.1. Primary Reference Receiver: Establish a GPS primary reference receiver station over a known, monumented NOS control station at the airport you choose as your base of operations.
 - 6.1.1. Control is available at the following airports within the operating area of the aerial survey (Honolulu, Molokai, Kailua-Kona, Lanai, Kahului, Lihue).
 - 6.2. If preexisting control is not of first order or better, or conveniently located, set a PK nail in a convenient spot.
 - 6.3. Observe two(2) static GPS surveys over the PK nail, following standard GPS procedures given in GPS Controlled Photogrammetry Field Operations Manual, Section 5.2.
 - 6.3.1. If the nearest Continuously Operated Reference Station (CORS) is less than 50KM away, observe two(2) static surveys of two(2) hours duration each.
 - 6.3.2. If the nearest CORS is greater than 50KM away, observe two(2) static surveys of four(4) hours duration each.
 - 6.4. Send the static GPS survey data to Tim Blackford via e-mail, the post office, or courier.
- 7.0. Project Schedule/Priority:
 - 7.1. This survey is scheduled to be begin April 1, 2000. Based on clear weather predictions, it is estimated that operations will continue until about June 20, 2000. However, weekly progress will be evaluated and a completion date may be modified.
 - 7.2. The contractor will provide personnel to operate the APTI.
 - 7.3. The Chief, Remote Sensing Division may alter or eliminate this priority.

8.0. Data Recording/Handling:

- 8.1. Record all photographic data as provided for in the Photo Mission Standard Operating Procedures.
- 8.2. Record and handle all GPS data as provided for in the GPS Controlled Photogrammetry Field Operation Manual.
- 8.3. Send one (1) copy of the kinematic GPS data from the aircraft and static data and station logs from the reference receiver to Tim Blackford, Applications Branch N/NGS33 weekly, unless otherwise requested.
 - 8.3.1. You will be notified by Tim Blackford when further in-house copies of the data have been made, at which time you may eliminate your copy.
- 8.4. Send EDI files to the Systems & Quality Assurance Branch with the exposed roll.
- 8.5. Fax a copy of the photographer's flight report for each roll of exposed film to the Requirements Branch(RB), RSD. Ship film and the original report to the contract photo laboratory for processing.
- 8.6. Film for this project must be reviewed quickly. Image quality is important for coral reef interpretation, therefore, if reflays are necessary this information must be sent to the field crew asap. Futhermore, Steve Rohman must be contacted when CN film arrives in S&QA.

9.0. General Guidelines for Aircraft GPS Operations:

- 9.1. It is advised that the Mission Commander download GPS satellite ephemeris and health data from the Arinc web site daily to ensure that the satellite constellation is adequate for kinematic operations. Their URL is: WWW.ARINC.COM\PRODUCTS_SERVICES/GPSSTAT.HTML. Download the three files that pertain to the daily and monthly ephemeris and satellite health data. These will all run under the same SEM program that has been previously used.
- 9.2. Run satellite visibility plots and PDOP predictions daily.
- 9.3. Base daily operations on the most current satellite ephemeris.
- 9.4. Standard operating Procedures for conducting a kinematic airborne GPS Survey are found in GPS Controlled Photogrammetry Field Operations Manual, Section 5.

9.5. Imaging operations will be conducted within approximately 325km of the primary reference receiver.

10.0. Satellite Lock:

10.1. Receiver lock on a minimum of four(4) satellites are required at all times during photographic operations for this project.

10.2. Receiver lock on satellites shall be in accordance with the specifications for kinematic GPS operations contained in the GPS SOP Section X.

10.3. If loss of lock occurs while flying any lines, follow the procedures outlined in the GPS SOP Section X, (Reestablish lock and re-fly the entire line where lock was lost.)

11.0. Contacts/Communications:

11.1. E-mail, FAX, or phone a project status or situation report to the Requirements Branch daily, even if there has been no change in project status or progress. A report of "no progress" or "no change" is preferable to no report at all. *See attached E-mail list.*

11.2. Check your E-mail box frequently; Requirements Branch personnel will forward any project changes or other pertinent data to e-mail address: Photol@Earthlink.net.

11.3. For questions or information regarding the operational aspect of this project contact:

Edward Allen (Requirements Branch)
Phone: (w) 301-713-2674, ext. 176
home 703-313-9166
home (beach) 804-435-3488
Internet: eallen@ngs.noaa.gov

11.4. For questions or information regarding the operational or theoretical GPS aspect of this project or in the event of total GPS failure or for questions or information regarding aircraft operations contact:

Jon Bailey
Phone: (w) 301-713-2663, ext. 160
(h) 301-990-8578
(Cell) 240-305-4041
(Fax) 301-713-4572
Internet: jbailey@ngs.noaa.gov

- 11.4.1 For questions or information regarding the operation of the APXI contact:

John Klein
Phone: (Cell) 410-340-6443

- 11.5. For questions regarding aerial camera maintenance or repair contact:

Steve Nicklas
Phone: (w) 301-713-2671
(h) 301-365-3221

- 11.6. When communicating with anyone outside the RB about any aspect of this project a copy of the communication must be forwarded to the RB. This includes notifying the RB that data have been sent.

- 12.0. Data provided with these Instructions:

One copy of the original Project Layout Diagram
Four copies of the flight maps
One floppy disk containing the files:

HI0001.wpt - waypoint input to flight management system
HI0001.xls - Microsoft Excel format of flight line input
HI0001.txt - Text version of way point input
Two copies of these instructions
One copy of the listing of other geodetic control in the area.

Approved _____
Edward Allen, Chief of RB

Date _____

Approved _____
Robert Rodkey, Chief of AB

Date _____

Approved _____
Steve Matula, Chief of S&QA

Date _____

Approved _____
CDR Jonathan Bailey
Chief, Remote Sensing Division

Date _____

cc: J. Bailey
R. Rodkey
S. Matula
E. Allen

E-MAIL LIST

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